

Remarks

Claims 6-20 are pending. Favorable reconsideration is respectfully requested.

The subject invention is directed to a process for the preparation of phosphonic ester-modified organosiloxanes in short time and high yield and purity, by reacting a phosphonatomethylalkoxysilane with a silanol-functional siloxane either neat or in the presence of organic solvent. Due to selection of the phosphonate reactant and the reaction conditions, the reaction is both surprisingly rapid and selective. Following removal of low molecular weight alcohol scission byproduct, the product is obtained generally in greater than 90%, and preferably greater than 95% yield. The reaction is quite rapid, and does not require an acid catalyst. As a result, reaction times are low, usually less than 5 hours, and generally in the range of about 2 hours. Due to the ability to proceed in the absence of highly acidic catalysts, alkoxy groups bonded to silicon can be maintained in the reaction product.

The claims have been objected to for containing "is reacted" in claim 6. This error has been corrected, and Applicants' attorney expresses his appreciation to Examiner Peng for pointing out this error. Withdrawal of the objection to the claims is respectfully solicited.

Claims 6-12 have been rejected under 35 U.S.C. § 102(b) as anticipated by Tanaka, U.S. Patent 4,617,344 ("Tanaka"). Applicants respectfully traverse this rejection.

Tanaka is directed to a process for forming aqueous lattices (emulsions or dispersions) of phosphonate-modified organopolysiloxanes by a very specific process wherein the organopolysiloxane starting material is emulsified in water with the aid of a specific class of organic sulfonic acid surfactants or sulfate ester surfactants, examples of which are described in column 4, line 31 to column 5, line 19. The phosphonate ester-modified alkoxy silane reactant is then added. These surfactants are strong acids and also serve as catalysts. The acid catalyzed reaction is very long: 16 hours in Example 1; 10 hours in Example 1; and 20 hours in Example 3.

Tanaka also discloses a further method wherein a salt of the specific surfactants is used, and is agitated with an acid ion exchange resin to replace the metal cation with acidic hydrogen, again providing a very acid catalyst. Under these conditions, considerable hydrolysis/condensation of the alkoxy groups of the alkoxy silyl group with each other is expected (this is one method of preparing polysiloxanes from alkoxy silanes), as well as hydrolysis of the OR groups of the phosphonate ester group. Thus, the products will contain numerous byproducts in addition to the desired products. The product is not isolated, but is used as the emulsion, which may be coated, sprayed, etc., onto substrates. Upon evaporation of water, rubbery films are obtained (see the Examples). The films still contain the surfactant which was used as emulsifier and catalyst, and is present in considerable quantity.

The claimed process takes place in a homogenous reaction mixture which is neat, i.e., solvent-free, or in organic solvent, preferably aprotic organic solvent. No emulsifier is needed, since there is no appreciable amount of water present, and thus the oily, hydrophobic siloxanes do not have to be emulsified. The subject invention reaction, due to the choice of silyl phosphonate and the neat or solvent-borne reaction conditions is also very fast, and can be conducted even in the absence of catalyst, if desired. When catalysts are used, only small amounts are necessary. In the Examples, for instance, only 0.5 weight percent of catalyst is used, and the catalysts need not even be acid catalysts. In *Tanaka*, by contrast, the amount of catalyst is from about 3% to 6% in Examples 1-3, the only preparative examples, and must be highly acidic.

As a result of Applicants' process, very pure products are obtained in high yield and short reaction time. The products are not highly contaminated with byproducts from condensation of silicon-bonded alkoxy groups with each other or from the partial hydrolysis of the phosphonate ester, since there is no water present for the hydrolysis.

Tanaka does not disclose the claimed process. Withdrawal of the rejection over *Tanaka* under 35 U.S.C. § 102(b) is respectfully solicited.

Claims 13-16 have been rejected under 35 U.S.C. § 103(a) as unpatentable over *Tanaka*. As *Tanaka* does not disclose, nor does he teach or suggest Applicants' basic process, whether it would be obvious to include the further limitations of claims 13-16 requiring an inert gas atmosphere would appear irrelevant. Withdrawal of the rejection of claims 13-16 over *Tanaka* is respectfully solicited.

New claims 17-20 have been added to more particularly point out and distinctly claim certain preferred embodiments of Applicants' invention. Claim 17 requires an aprotic organic solvent, while claim 18 requires that no catalyst be present. Claim 19 requires a neat reaction, as in all the Examples, while claim 20 requires the reaction mixture to be homogenous. All the new claims are fully supported by the specification, for example on page 7 (no catalyst); page 8 (neat; no solvent) and use of aprotic solvent and homogenous reaction mixture.

Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, he is highly encouraged to telephone Applicants' attorney at the number given below.

Respectfully submitted,
OLIVER SCHAEFER et al.

By /William G. Conger/
William G. Conger
Reg. No. 31,209
Attorney for Applicants

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BROOKS KUSHMAN P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075-1238
Phone: 248-358-4400
Fax: 248-358-3351